Fisheries and Oceans Canada | Pêches et Océans Canada
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Quebec Region

Canadian Science Advisory Secretariat
Science Response 2017/008

UPDATE OF STOCK STATUS INDICATORS FOR NORTHERN SHRIMP IN THE ESTUARY AND GULF OF ST. LAWRENCE

Context

The stock assessment of Northern Shrimp (*Pandalus borealis*) in the Estuary and Gulf of St. Lawrence is conducted every two years, with the most recent assessment completed in January 2016. The precautionary approach adopted for this fishery demands an annual update of the stock status indicators. This indicator of stock status is calculated from the indices obtained from the summer commercial fishery and the Fisheries and Oceans Canada (DFO) research survey. This update has been prepared to provide to the Fisheries Management the projected harvests for 2017 in the four shrimp fishing areas (SFA 8, 9, 10 and 12) according to the guidelines of the precautionary approach.

This Science Response Report results from the Science Response Process of January 24, 2017 on updated indicators status of the Northern Shrimp stocks in the Estuary and Gulf of St. Lawrence.

Background

The Northern Shrimp fishery in the Gulf of St. Lawrence is conducted by trawlers in four shrimp fishing areas: Estuary (SFA 12), Sept-Iles (SFA 10), Anticosti (SFA 9) and Esquiman (SFA 8).

Shrimp fishing is regulated by a number of management measures, including the setting of total allowable catches (TAC) in the four areas. TAC-based management limits fishing in order to protect the reproductive potential of the population. The essential elements for the establishment of a precautionary approach were adopted in 2012. Reference points were determined and harvest guidelines were established based on the main indicator and its position in relation to the stock status classification zones (healthy, cautious and critical). Once the harvest is projected, decision rules are applied by Fisheries Management to determine the TAC.

Description of the Fishery

Following the last assessment, the 2016 TAC was reduced by 8.4% in the Estuary fishing area and 15% in Esquiman while it remained stable in the Sept-Iles and Anticosti areas. The preliminary statistics in 2016 indicate that the landings from all areas were 28,010 tons for a possibility of 30,213 tons. Preliminary landings reached more than 94% of the TAC in the majority of areas except the Anticosti area where 85.7% of the TAC was reached (Figure 1). Total fishing effort increased by 28% in 2016 to total approximately 117,000 fishing hours.

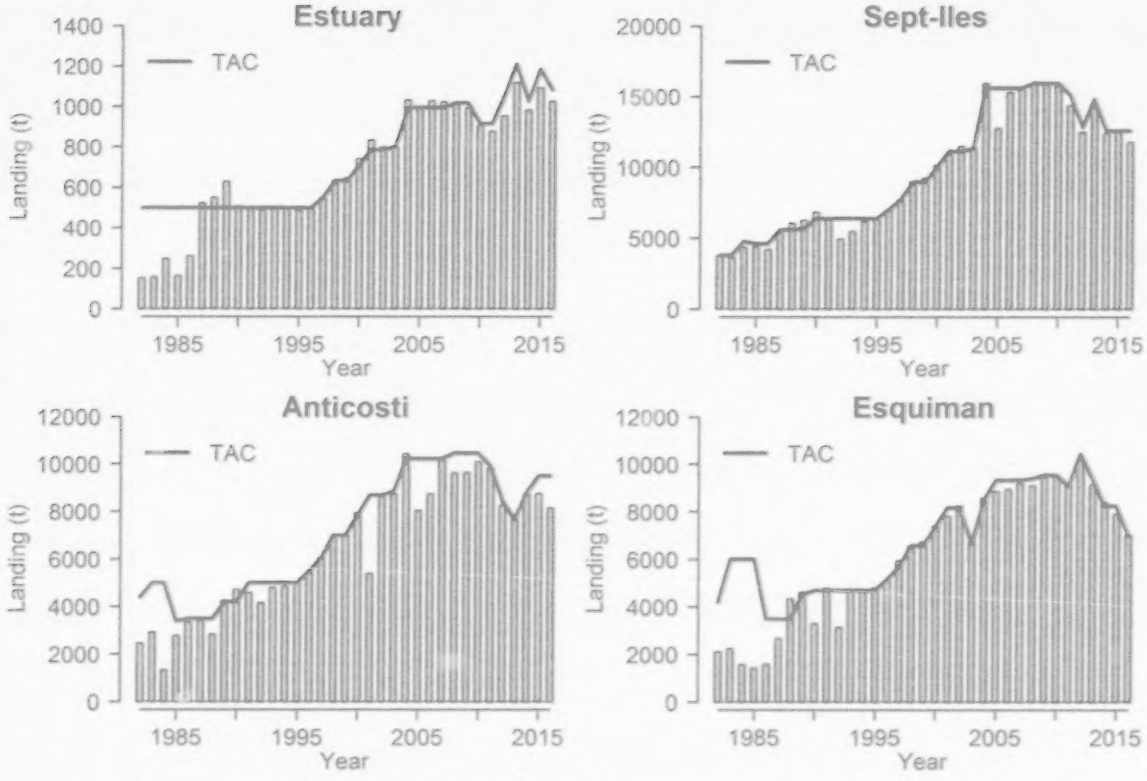

Figure 1. Landings and total allowable catch (TAC) by fishing area and by year. The 2016 landings data are preliminary.

Analysis and Response

Abundance indices

The update of the main stock status indicator is based on two independent sources of data, the number of shrimp per unit of effort (NPUE) from the summer commercial fishery (June, July and August) and the index of shrimp abundance from the DFO research survey. From these two sources of data, indices for male and female components are estimated, for a total of four indices by fishing area. In order to combine them into one indicator, each index is standardized in relation to a reference period.

In the Sept-Iles and Anticosti areas, indices for the male component declined in 2016 compared to 2015, while they increased slightly in Esquiman and diverged in the Estuary (Figure 2). For the female component, all indices decreased in 2016 with the exception of the Esquiman research index where the value is comparable to that observed in 2015.

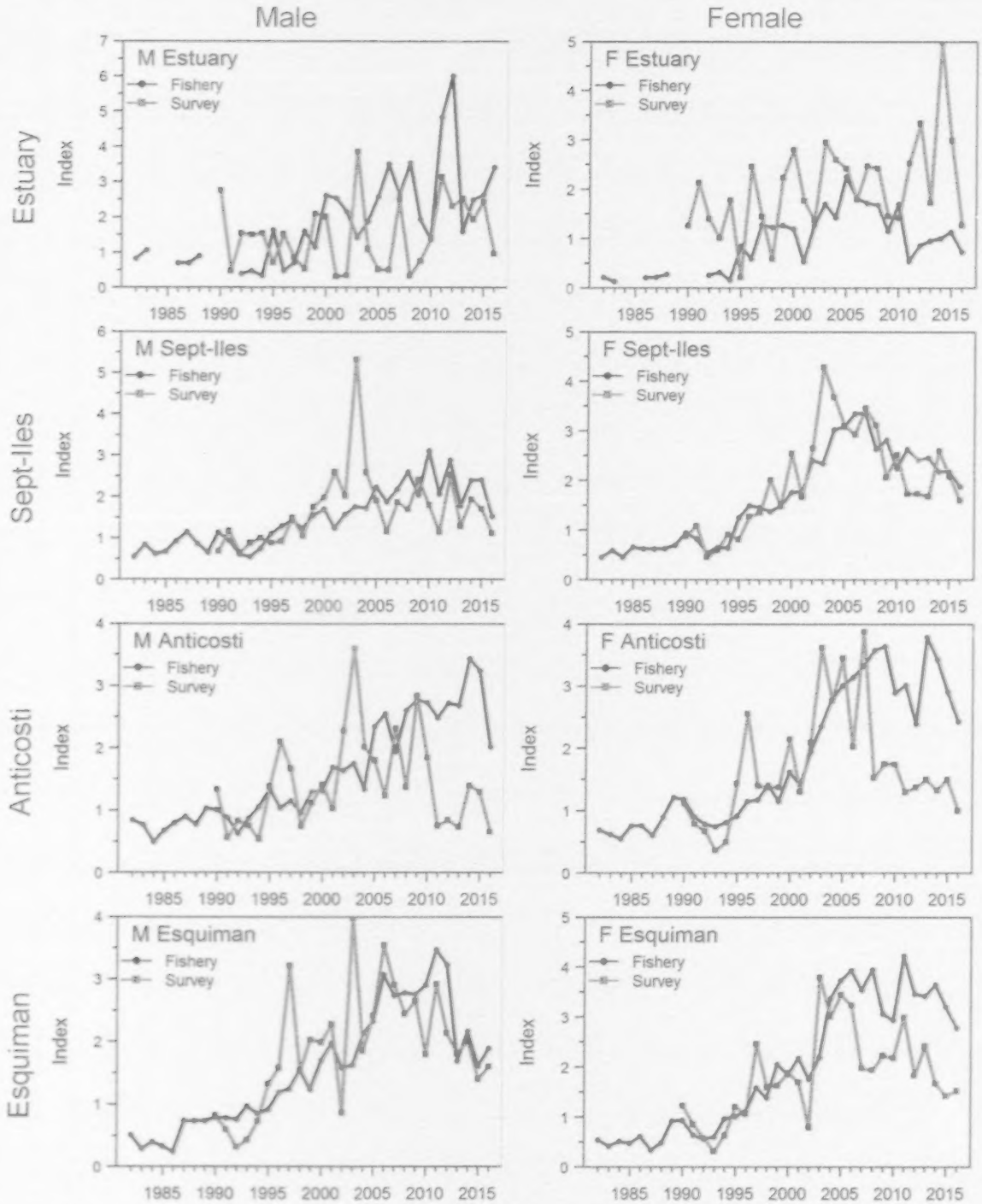

Figure 2. Standardized indices from the commercial fishery (blue) and the research survey (red) for males (M) and females (F) by fishing area and year.

Main stock status indicator

For each stock, the main stock status indicator represents the mean of the four indices, the males and females obtained from the summer commercial fishery and the DFO research survey.

The main indicator of stock status shows that the four stocks were in the healthy zone in 2016. The stock status indicators for Estuary, Sept-Iles and Anticosti decreased significantly in 2016 (Figure 3); these decreases range between 27 and 32%. The indicator remained stable in Esquiman in 2016.

The main indicator for Estuary shows large inter-annual variations and has been decreasing for 2 years. The indicator for Sept-Iles shows significant inter-annual variations in recent years, with a general downward trend since 2003. The indicator in Anticosti, which was high and stable over the past three years, decreased significantly in 2016. The indicator in Esquiman stabilized in 2016 following four years of decline. In all cases, the main indicator of stock status now compares with the values observed in the early 2000s.

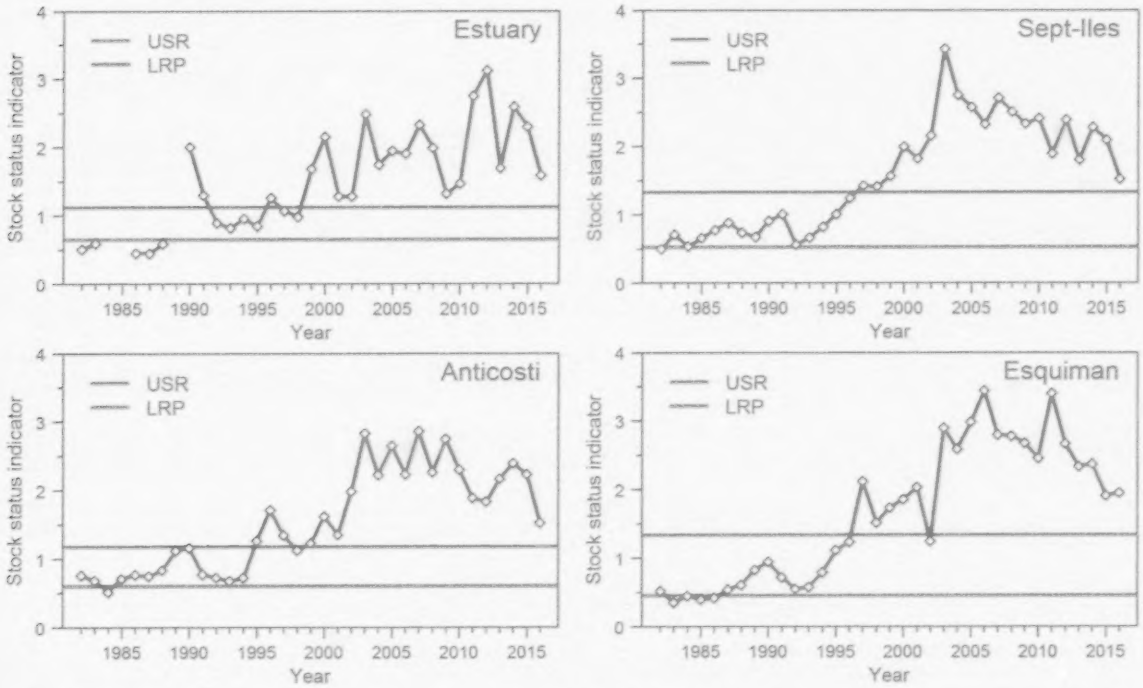

Figure 3. Main stock status indicator by year and limit (LRP) and upper (USR) stock reference points for each fishing area.

Conclusions

Although the four northern shrimp stocks in the estuary and Gulf of St. Lawrence have been maintained in the healthy zone since the early 2000s, the main indicator of the status of each stock has been declining in recent years and is close to the upper reference point and the caution zone.

Deep water temperature continues to warm and redfish biomass is increasing. These changes may have an impact on the dynamics and productivity of Northern Shrimp, including changes in spatial distribution, growth, reproduction and trophic relationships. These changes in environmental and ecosystem conditions in the Gulf of St. Lawrence will be reviewed in detail during the next shrimp stock assessment.

The analysis of the indicators for the last year shows that trends in the status of stocks have changed in 2016. There is a significant decrease in the stocks of Estuary, Sept-Iles and Anticosti, although they showed some stability during the last five years. The downward trend observed in recent years in Esquiman has not improved. However, a re-assessment of stock status is not warranted since the precautionary approach adopted for this fishery provides for an annual updating of the main indicator of stock status and, if necessary, an adjustment of TACs.

According to the guidelines, the projected harvests for 2017 are 750 t for Estuary, 8,967 t for Sept-Iles, 6,364 t for Anticosti and 6,876 t for Esquiman (Figure 4). The 2017 TACs will be determined by Fisheries Management from these harvest values according to the decision rules.

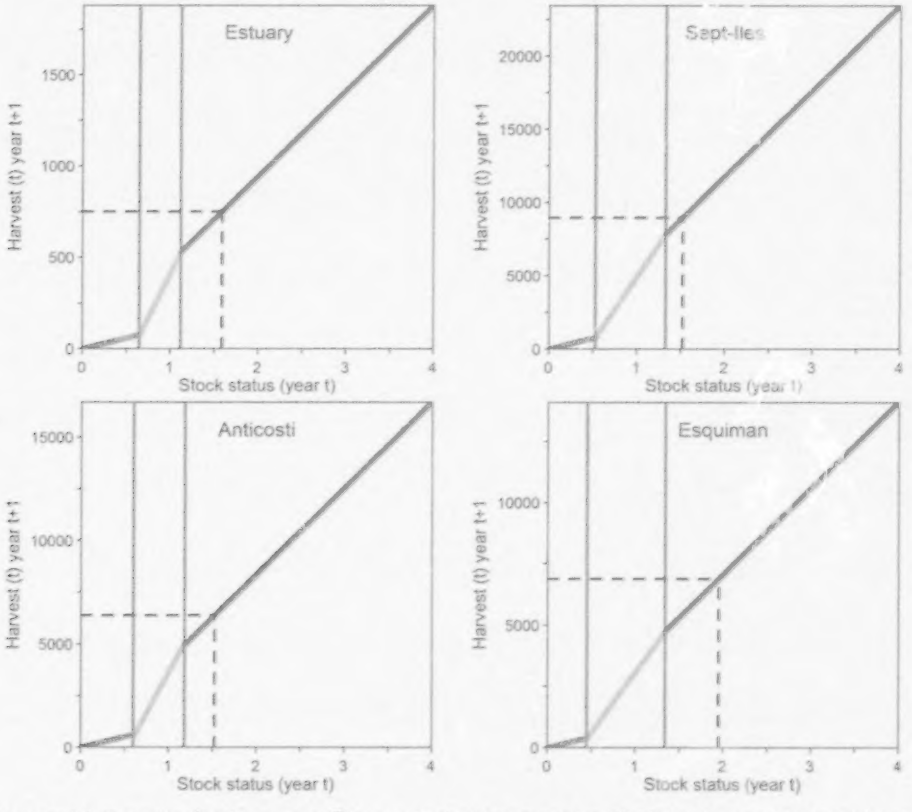

Figure 4. Harvest guidelines by fishing area. The projected harvest for 2017 is shown (dashed line) in view of the main stock indicator in 2016.

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Sources of information

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